



# *Compliance Bulletin* *Hazardous Waste* **Management of Electronics Waste**

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## **Why Regulate Electronics Waste?**

Many electronic devices contain individual components made with hazardous constituents, primarily heavy metals. Cathode ray tubes (CRTs) found in color televisions and color computer monitors contain significant amounts of lead. Printed circuit boards and complex circuitry found in computers and other electronic devices may contain lead, chromium, and silver. In addition to this, some older computers contain mercury switches, and many kinds of electronic devices contain batteries including nickel-cadmium, lithium, or sealed lead acid. Used electronics are a Resource Conservation and Recovery Act (RCRA) hazardous waste if: 1) the used electronic equipment is no longer useable and has been determined to be a waste; 2) the material exhibits the characteristic of toxicity; and 3) the used electronic equipment originated from non-residential sources such as businesses, academic institutions, or government agencies.

## **Which electronic devices are not regulated as hazardous waste?**

Household waste is exempt from the Colorado Hazardous Waste Regulations and associated RCRA requirements. "Household" includes single-family homes, apartment complexes, hotels and motels, retirement homes, bunkhouses, ranger stations, crew quarters, picnic areas, campgrounds, and day-use recreation areas.

Households are encouraged to recycle their used electronics, but they are not required to do so and may choose to dispose of this waste in the municipal solid waste stream. Because households can dispose of their used electronic equipment in the regular trash, used electronics generated from residential sources are considered to be a waste when the resident decides to dispose of it. Therefore, when a recycler accepts used electronics from residential sources, they are managing an exempt solid waste. Useful equipment and useful parts taken from this equipment may have value and can be resold as a commodity. Equipment and components that have no resale value are still considered exempt residential solid wastes, even when managed by a recycler. However, since the recycler's stated purpose in accepting these wastes is to recycle

them, it is anticipated that even the non-working equipment will be recycled in some manner.

It is important for recyclers to be able to distinguish residential electronics waste from equipment accepted from non-residential sources (i.e., industrial facilities, businesses, schools, government agencies) since these materials have very different regulatory requirements. Wastes from these two sources should be managed separately by the recycler and normal business records should be maintained that document the source of each piece of equipment. Alternatively, the recycler can commingle electronics from residential and non-residential sources, but then all of the equipment must be managed as though it originated from non-residential sources.

Only electronic wastes determined to be hazardous waste are subject to the hazardous waste regulations. Cathode ray tubes (CRTs) associated with monochrome monitors and black & white televisions do not tend to fail the toxicity test for lead and are generally not considered hazardous waste. These CRTs may be managed as solid waste. Electronic wastes from non-residential sources that **are not hazardous** may be disposed of in a properly managed municipal solid waste landfill or sent to a legitimate recycler. Landfills and recyclers may impose their own restrictions to regulate incoming wastes in accordance with local rules or company guidelines. Consult the landfill operator or recycler regarding their requirements.

## **Which electronic devices are regulated as hazardous waste?**

Non-residential sources that send their color monitors, color televisions, or other electronic devices for disposal are considered the generator of the waste and must follow regulatory requirements regarding proper waste management and disposal. Colorado regulations prohibit non-residential sources from disposing of any hazardous wastes in solid waste landfills.

Used electronic equipment and components removed from electronic equipment would be regulated as RCRA hazardous wastes if the material exhibits the

characteristic of toxicity. This is determined by using the Toxicity Characteristic Leaching Procedure (TCLP) test. If the extract from a representative sample of the waste contains one or more of the eight toxicity characteristic metals at a concentration greater than or equal to the maximum contaminant concentration for that metal, the waste would be hazardous waste. For example, wastes exhibiting the toxicity characteristic for lead (TCLP  $\geq$  5.0 ppm lead) would carry the hazardous waste code D008.

The most recent data available demonstrates that waste cathode ray tubes (CRTs) from color monitors and color televisions consistently exceed the regulatory limit for lead when tested using the TCLP. Due to their weight and size, CRTs comprise a significant portion of the overall monitor or television and will cause the entire unit to be considered hazardous waste. As a result, it should be assumed that non-residential color monitors and color TVs that are destined for disposal are hazardous waste unless the generator has tested their equipment to show that it is not hazardous or has other supporting data from the manufacturer.

With the exception of color monitors and televisions, there is very little information available to make general statements about the hazardous characteristics of intact electronic devices. Certain electronic components have been shown to frequently fail the toxicity test for metals. Electronic devices that contain a high proportion of components that fail the toxicity test should be assumed to be hazardous unless specific information is available to show otherwise. The regulatory status of each device or component will depend on its specific characteristics and how each item is disposed or recycled.

To make a hazardous waste determination, the generator must have information on hazardous constituents and their quantities in the waste. With electronic wastes, the generator may have little direct process knowledge on which to make a hazardous waste determination. The generator, however, may base the determination on data obtained from the manufacturer, other generators, or industry studies.

### **What if the electronics are recycled?**

Non-residential sources that send their color monitors, color televisions, or other electronic equipment for recycling are not considered generators of a waste. In this case, electronic equipment destined for recycling

is not considered a waste until it is determined if the unit can be resold, repaired, refurbished, used for parts to repair or refurbish other equipment, etc. Typically, the decision on whether a piece of electronic equipment or a component removed from electronic equipment is a waste or not is made by one or more recyclers. The recycler determines whether the unit can be resold, donated, or otherwise repaired or refurbished as a useable item. The recycler may also dismantle the equipment to directly reuse or sell parts from the device. In fact, it is not until the recycler determines that the equipment and/or its components are no longer useable that a waste is generated. In this case, the recycler is considered to be the generator of the waste and is responsible for proper waste characterization and management.

Because the recycler determines whether or not an electronic device or component is a waste, they must maintain documentation that describes how recycling is occurring and that demonstrates that an appropriate waste determination has been made either by them or by a subsequent recycler.

### **How should electronic equipment and components determined to be hazardous waste be managed?**

Electronic equipment and components removed from electronic equipment determined to be hazardous wastes can either be managed in full compliance with the Colorado Hazardous Waste Regulations [6 CCR 1007-3] Parts 260-268, 99 and 100, or they can be managed in compliance with the reduced requirements of the Universal Waste Rule in Part 273. The Universal Waste Rule provides an alternative set of reduced management standards that the generator can follow instead of the full hazardous waste requirements. This rule was designed to reduce the regulatory burden on facilities that generate these wastes while at the same time reducing the amount of hazardous waste items illegally sent to municipal solid waste landfills.

### **What are Universal Wastes?**

The Universal Waste Rule [Colorado Hazardous Waste Regulations 6 CCR 1007-3 Part 273] includes certain hazardous wastes that are commonly generated by very small to very large non-residential sources such as businesses, governmental agencies, and schools. Universal wastes are subject to wide spread use, which makes disposal of these hazardous wastes difficult to control.

Universal Wastes include many:

- batteries
- pesticides
- mercury-containing devices
- mercury-containing lighting wastes
- aerosol cans
- electronic devices and components

Materials included as universal wastes are regulated under the Resource Conservation and Recovery Act (RCRA) and have been required to be handled as hazardous wastes since the early 1980s. In the past, if these wastes were determined to be a hazardous waste, small and large quantity generators of hazardous waste needed to manage them in full compliance with the hazardous waste regulations, including labeling, employee training, manifest requirements, and restrictive time limits. [6 CCR 1007-3 Parts 260 - 268, 99, 100]

### Why manage waste electronics as universal waste?

Managing hazardous electronics waste as universal wastes is most beneficial to small and large quantity generators of hazardous waste, or conditionally exempt small quantity generators that would otherwise be small quantity generators if they did not manage some of their wastes as universal wastes. The primary benefits of choosing the reduced management standards of the universal waste rule are that the waste does not count toward the monthly total of hazardous waste in determining generator category; the waste can be shipped without a hazardous waste manifest; the waste can be shipped by common carrier instead of a hazardous waste transporter; there are reduced notification and record-keeping requirements, and the storage time limits are less restrictive. Because universal waste does not require a hazardous waste manifest for shipment in Colorado, it is not considered hazardous waste under US Department of Transportation regulations, though other regulations may apply. State requirements for universal waste transporters are included in 6 CCR 1007-3 Part 273 Subpart D.

### What are the requirements for universal waste management?

#### Categories of Universal Waste Handlers

Under the Universal Waste Rule, persons who generate or accumulate waste electronic devices and

components are considered “handlers” of universal waste. [6 CCR 1007-3 Section 273.9] [Note: this definition is different from that of a **generator** of hazardous waste].

There are two categories of handlers, Small Quantity Handlers of Universal Waste and Large Quantity Handlers of Universal Waste. A small quantity handler of universal waste is one who does not accumulate more than 5,000 kilograms of total universal at any one time. A large quantity handler of universal waste is a handler of universal waste who accumulates 5,000 kilograms or more of total universal waste. [6 CCR 1007-3 Section 273.9] The designation of small quantity or large quantity handler of universal waste has no relationship to a facility’s hazardous waste **generator** status. Thus a small quantity generator of hazardous waste may be a large quantity handler of universal waste, and a facility that is a large quantity generator of hazardous waste may be a small quantity handler of universal waste.

If, at any time during a calendar year, a facility exceeds the quantities for a small quantity handler of universal waste, they would be considered a large quantity handler until the next calendar year when they can reevaluate their status. [6 CCR 1007-3 Section 273.9]

#### Labeling

When a universal waste is generated, it must be labeled as either “Waste (*material type*),” “Used (*material type*)” or “Universal Waste (*material type*).” For example, waste electronics that are managed as a universal waste must be labeled as “Waste Electronics,” “Used Electronics,” or “Universal Waste Electronics.” If the device or component is placed into an accumulation container, only the accumulation container needs to be labeled as containing waste electronics, not the individual devices or components within it. If the electronic device or components are not in good condition or are broken, they must be placed in a closed packing container that is properly labeled and capable of preventing leakage or releases of hazardous constituents to the environment under reasonably foreseeable conditions. [6 CCR 1007-3 Sections 273.14, 273.34] If the accumulation container is not in good condition, it must be over-packed, or the electronic device must be removed and put into a container that is in good condition.

### Accumulation of Waste

Universal waste handlers are required to manage their waste in a manner that prevents releases of the waste or waste constituents. [6 CCR 1007-3 Sections 273.13, 273.33] There is a one year accumulation time limit, and handlers must be able to demonstrate that universal waste on-site has not been accumulated for more than one year. [6 CCR 1007-3 Sections 273.15, 273.35] Although it is not required to be marked with the accumulation start date, this would be the easiest way to document that the waste is in compliance with the one year accumulation limit.

### Shipment of Waste

A universal waste handler cannot dispose of universal waste, and treatment by the handler is not allowed except under limited conditions (see the section on handler treatment). Universal waste can only be shipped to another universal waste handler, a destination facility or a foreign destination. Shipment to another universal waste handler is allowed to aid in consolidation of wastes. A destination facility is a facility that is permitted to treat, dispose, or recycle the waste. [6 CCR 1007-3 Section 273.9]

Shipment of universal waste in Colorado does not require the use of the hazardous waste manifest system. Therefore, universal waste is not considered hazardous waste under US DOT regulations. Some universal wastes are regulated by the US DOT as hazardous materials because they meet criteria for one or more hazard classes, but the word "waste" may not be used in the shipping name. [6 CCR 1007-3 Section 273.52]

Other states may have different requirements for wastes that are managed as universal waste in Colorado. The handler should always confirm the regulatory status of universal wastes in the destination state and in all intervening states the waste will travel through.

### Notification

Small quantity handlers of universal waste are not required to notify the Division of their universal waste management activities. [6 CCR 1007-3 Section 273.12] Large quantity handlers of universal waste are required to notify the Division of their universal waste management activities and obtain an EPA identification number using EPA Form 8700-12. [6 CCR 1007-3 Section 273.32] This must be done even

if the facility has previously given notification and received an EPA identification number for its hazardous waste activities. The EPA identification number will remain the same.

### Employee Training

Small quantity handlers of universal waste are required to inform all employees who manage universal waste about the proper handling and emergency procedures appropriate to the types of universal waste at the facility. [6 CCR 1007-3 Section 273.16] Large quantity handlers of universal waste are required to ensure that personnel are thoroughly familiar with the requirements for universal waste management and emergency response relative to their level of responsibilities in dealing with the waste. [6 CCR 1007-3 Section 273.36]

### Spills

All handlers of universal waste are required to immediately containerize and appropriately manage any spills or residues from releases of universal wastes. [6 CCR 1007-3 Sections 273.17(a), 273.37(a)] The waste generated from a release of universal waste would be considered newly generated waste, and a hazardous waste determination would need to be made. If it is determined that any or all of the released material or residue is hazardous, it must be managed in accordance with the hazardous waste regulations and not the universal waste requirements. [6 CCR 1007-3 Sections 273.17(b), 273.37(b)] The handler of the universal waste at the time of the release would be the generator of the newly generated hazardous waste and must adhere to all applicable requirements of the Colorado hazardous waste regulations.

### Record Keeping Requirements

A small quantity handler of universal waste is not required to maintain records. [6 CCR 1007-3 Section 273.19] However, it is strongly advisable to keep adequate records to document waste management practices and substantiate the facility's universal waste handler status.

A large quantity handler of universal waste must keep written records for universal wastes shipped to and from its facilities. These records must be kept for at least three years and include: the types and quantities of universal waste shipped or received, the date the waste was shipped or received, and to whom the waste

was shipped. [6 CCR 1007-3 Section 273.39 ] There is no requirement to maintain formal training records for either category.

Transporters of universal waste are required to keep records in accordance with US DOT requirements. A destination facility is subject to all applicable requirements of 6 CCR 1007-3 Parts 264-268, 99 & 100. If the destination facility recycles the universal waste without storing it, they need only notify the Department of their activity under 6 CCR 1007-3 Part 99 and keep records of each shipment. If the destination facility is a Treatment Storage and Disposal Facility (TSDF), they are required to keep records in accordance with their hazardous waste permit.

### **Can a universal waste handler treat it's hazardous wastes?**

Universal waste handlers can't dispose of universal wastes and treatment by the handler is not allowed except under limited conditions.

Disassembly of universal waste electronic devices is allowed by handlers of universal wastes as long as these activities are conducted in accordance with the requirements of Part 273.13 or 273.33 of the Colorado Hazardous Waste Regulations. Prior to disassembly, a handler must develop and implement a written procedure detailing how to safely disassemble each electronic device managed at the facility. Included in this document must be the type of equipment to be used, operation and maintenance of all equipment and precautions that need to be taken to protect workers. In addition, the document must include a review of the wastes that will be generated from these activities.

Handlers of universal wastes must ensure that the devices are disassembled in a manner that prevents the release of any universal waste or component of universal waste to the environment. Special management procedures necessary to manage the waste properly also need to be evaluated prior to disassembly. Employees must be thoroughly familiar with the procedures for disassembling each electronic device, proper waste handling practices and emergency procedures relevant to their job responsibilities. A spill kit must be readily available in case wastes are spilled during the removal activities. The handler must maintain a system to ensure compliance with the written disassembly and management procedures.

A small or large quantity handler of universal waste who disassembles universal waste electronic devices, or who generates other solid waste as a result of disassembling electronic devices, must determine whether the disassembled device, its components or other solid wastes generated exhibit one or more characteristics of hazardous waste. If the disassembled electronic device or its components exhibit one or more characteristics of hazardous waste, they may continue to be managed as universal wastes. If the disassembled device or its components are not managed as universal waste, then the handler is considered the generator of a newly generated hazardous waste and is subject to all applicable requirements of 6 CCR 1007-3 Parts 260-268, 99 and 100. If other solid wastes generated during disassembly exhibit one or more characteristics of hazardous waste, the handler is considered the generator of the newly generated waste and must comply with all applicable sections of 6 CCR 1007-3 260-268, 99 and 100. If the disassembled devices, its components or other solid wastes generated do not exhibit any characteristics of hazardous waste, the handler may recycle them or dispose of them as solid wastes.

### **What about Conditionally Exempt Small Quantity Generators (CESQG)?**

Conditionally exempt small quantity generators are those that generate less than 100 kilograms (approximately 25 gallons or 250 pounds) of total hazardous waste and no more than one kilogram of acutely hazardous waste per calendar month AND never accumulate more than 1000 kilograms of hazardous waste on site at one time. In Colorado, conditionally exempt generators are not excused from identifying which of their wastes are hazardous wastes and must ensure that their wastes are sent to a facility that is permitted to accept it.

Conditionally exempt small quantity generators may choose to manage their waste electronic devices and components as conditionally exempt wastes or as universal wastes. [6 CCR 1007-3 Section 273.8] Because of the reduced management requirements already applicable to conditionally exempt small quantity generators of hazardous waste, it is generally not to their benefit to manage their wastes as universal waste, unless they would otherwise be small quantity generators. Unlike small and large quantity generators of hazardous waste, conditionally exempt generators are not required to notify the State of their

regulated waste activity or to get an EPA identification number. There is no time limit on how long they may store their hazardous waste on site as long as they don't exceed the quantity limits for conditionally exempt small quantity generators, and they may transport their hazardous waste without a hazardous waste manifest under a standard bill of lading.

Conditionally exempt generators may not dispose of their hazardous wastes on site or send them to a solid waste landfill in Colorado. These wastes must be sent to a permitted hazardous waste treatment, storage or disposal (TSD) facility, sent to a legitimate recycler of the waste, or sent to an out-of-state solid waste disposal facility that is permitted to accept conditionally exempt small quantity generator hazardous wastes.

**For more information please contact:**

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This Compliance Bulletin is intended to provide guidance on the appropriate management of wastes based on Colorado solid and hazardous waste statutes and regulations only. The wastes described in this guidance may also be regulated under other statutes and regulations.

Note: See also responsible computer management brochure at [www.cdphe.state.co.us/hm/electronicsrecyclingbrochure.asp](http://www.cdphe.state.co.us/hm/electronicsrecyclingbrochure.asp).